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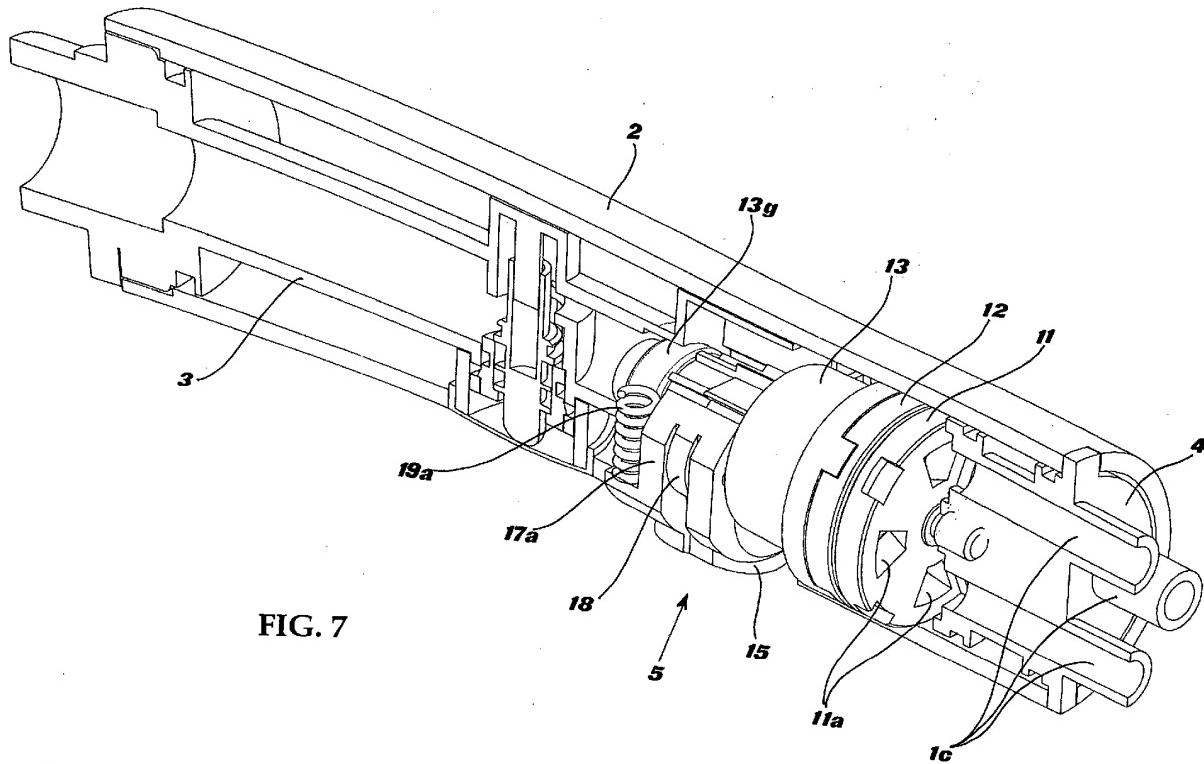
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(54) Showerhead with continuous control of the water jets and related selector device

(57) A selection device and a handshower are disclosed, of the type comprising a handle and a dispensing head equipped with a plurality of delivery conduits (1c), the conduits (1c) ending in a connection body (11) with inlet ports circumferentially arranged on a plane surface, further comprising a selection body (12) equipped with two supply ports which may be displaced in correspondence of said inlet ports by rotating said se-

lection body (12) in respect of the connection body (11), wherein said selection body (12) is integral with a circular saw tooth and said handle houses a push-button (15), which may be translated substantially crosswise to the rotation axis of said selection body (12), equipped with a dog spike capable of driving into rotation said saw tooth in a displacement direction of said push-button (15), but not in the opposite direction.



Description**BACKGROUND****Field of the invention**

[0001] The present invention relates to a handshower for the dispensing of water of the type having multiple secondary outlet conduits; in particular, it relates to a handshower of this type equipped with a flow selector to deviate the single supply flow onto the desired one among secondary conduits.

[0002] As known, in correspondence of sinks, wash-basins and other sanitary appliances, handshowers of the most diverse shapes and operation modes are employed to dispense water.

[0003] Since the same handshower can be used in different ways, it has now become common practice in the field to provide a dispensing head with differentiated flows, for example one having a single central jet and a plurality of smaller jets circumferentially arranged. In this case the handshower also features a manoeuvring member or a selector mechanism which allows the user to choose the water dispensing mode. Generally speaking, the selector mechanism provides to interrupt the water supply main flow and to direct it, according to the user's choice, towards an outlet nozzle or to another nozzle through respective delivery conduits.

[0004] Selector mechanisms can be roughly divided into two main categories: those arranged in and integral with the dispensing head - which may be operated by a rotating coupling ring which couples in a differentiated way two selection plates - and those located on the handshower handle - which are normally operated by levers or push-buttons.

[0005] The mechanisms of the first type are preferable from a functional point of view, because they allow wider adjustment possibilities, being able to exploit the coupling between two plates varying their position over a complete 360° rotation. However, the coupling ring structure requires such mechanisms to be arranged directly on the dispensing head: from an operation point of view, the user is hence forced to act on the head, thereby interfering with the water outlet area; these selection systems are therefore employed in showers only.

[0006] A mechanism of this type is known for example from PCT/EP01/13525 in the name of the same Inventor.

[0007] The mechanisms of the second type are instead subject to a significant functional limitation, since they are mounted on the handle in the shape of levers or push-button switches, and do not offer the opportunity to exploit many different settings. A switch lever, such as the one illustrated in US 4.629.124 in the name of Hansa Metallwerke AG for example, can be operated choosing between two settings only.

[0008] Besides, the setting selection direction must necessarily be reversed to change from one setting to

the other, which is not welcome, both from the point of view of the dimensions and of the operation thereof. As a matter of fact, one only needs to think of a push-button or of a selection lever which can be comfortably pushed

5 to select a certain setting, but which must then be uncomfortably lifted to bring it back to the original setting; or of a lever which can be shifted about the longitudinal axis of the handle, the rotation of which, for a left-handed person, can be comfortable in one direction but not in the opposite one.

[0009] The problems set forth above are easily understandable by referring to the prior art handshowers illustrated, for example, in the documents US 4.209.132 in the name of Well Men Industrial Company Ltd. and FR 2.683.745 in the name of Valentin France SA.

[0010] It is the object of the present invention to overcome the disadvantages of the handshowers equipped with selection mechanisms on the handle, in particular by providing a selector design which allows adjustment

20 with a one-way intervention, i.e. without the need to reverse the setting selection direction, and by coupling two selector components mutually rotating over a 360° circumference.

25 BRIEF DESCRIPTION OF THE INVENTION

[0011] According to the invention, the object set forth above is achieved by means of a water-dispensing handshower and relative selector device as described in their essential features in the attached claims.

[0012] Further features and advantages of the handshower and of the selector device according to the invention will in any case be clearer from the following detailed description of a preferred embodiment of the invention, given by way of example and illustrated in the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS**40 [0013]**

Fig. 1 is an elevation side view of a handle portion of the handshower of the invention;

fig. 1A is an elevation front view of the handle of fig. 1;

fig. 2A and 2B are longitudinal and cross section views, respectively, taken along the line I-I and II-II of fig. 1A and of the same fig. 2A;

fig. 3 is a perspective view of the handle of fig. 2A truncated in correspondence of the line II-II;

fig. 4 is a partial-section perspective view of the selector device contained in the handle of fig. 3;

fig. 5 is a section view taken along a horizontal plane of the handle of fig. 1;

fig. 6 is a section view taken along a vertical plane of the handle of fig. 1; and

fig. 7 is a view similar to that of fig. 6, open from the opposite side and with the selector mechanism and

the switch not in section.

DESCRIPTION OF THE PREFERRED EMBODIMENT

[0014] In fig. 1 there is represented a portion of a handle 1 for a handshower. In a manner known per se, at one entry end 1a of the handle a water supply duct (not shown) is intended to be coupled, while at the other outlet end 1b a dispensing head (not shown) is engageable and capable of letting the water flow out through a series of nozzles which may be alternatively selected. In the embodiment illustrated, the dispensing head provides up to four different water delivery conduits and, correspondingly, the outlet end 1b features four distinct outlet ports 1c (fig. 1A).

[0015] The handle 1, in particular, consists of a cylindrical housing 2, slightly curved to facilitate an ergonomic grip, inside which are housed an entry insert body 3, an outlet insert body 4, and a selector mechanism 5.

[0016] The entry insert body 3 has the shape of a tubular supply body, with a larger diameter at one coupling end 3a by which it protrudes from the housing 2. The coupling end 3a is precision-fitted at the mouthpiece of the housing 2 with the interposition of an O-ring-type seal 6.

[0017] The tubular supply body 3 ends inside the housing 2 with a circular flange 3f from which projects, in the upper part (in fig. 2A), a guide and sliding element 7, open downwards with an upturned U shape (in fig. 2A), the function of which will be discussed further on.

[0018] At the outlet end 1b, a similar outlet insert body 4 is coupled with the mouthpiece of the housing 2 by interposing a pair of watertight O-ring seals 8 and 9. Within the outlet insert body 4 are obtained the four channels 1c, mutually parallel and circumferentially equidistant.

[0019] According to the invention, in the central part of the insert body 4 there is engaged a threaded pin 10 which extends inwardly in a longitudinal direction, terminating in a manoeuvring head, for example a screw head 10a.

[0020] Onto the pin 10 is fixed a ceramic disc 11, which features four holes 11a in correspondence of the mouthpieces of the channels 1c. The disc 11 is fixed and adheres to the end surface of the insert body 4 and hence the holes 11a represent the mouthpieces and a junction surface of the channels 1c. Advantageously, the holes 11a feature a slightly countersunk surface (as can be seen in fig. 2A) representing a connecting surface for the water throughflow.

[0021] Between the insert body 4, generally made of moulded plastic material, and the ceramic disc 11, in correspondence of the connection between the holes 11a and the channels 1c, two small watertight seals 4c are provided.

[0022] On the pin 10 a second ceramic disc 12 is further mounted, free to rotate, equipped with two dispensing ports 12a, mounted integral with a tubular control

body 13.

[0023] The tubular control body 13 is engaged in a seat 3b of the tubular supply body 3, where it is rotatably supported. For that purpose a PTFE ring 13g is provided between the two pieces, in order to avoid friction and chafing which would cause component wear; the seal between the pieces 13b and 3b is guaranteed by a lip seal.

[0024] The front coupling of the two ceramic discs 11 and 12 has proved particularly effective in guaranteeing a sliding seal without the need to interpose any gasket. In this way, the rotation of the ceramic disc 12, equipped with two dispensing ports 12a, against the fixed ceramic disc 11, achieves the desired selection, since it leads the dispensing ports 12a - communicating with the inner room of the tubular control body 13, which in turn communicates with the inner room of the tubular supply body 3 - alternatively in communication with one of the four holes 11a of the four distinct channels 1c. The pair of the two coupled and mutually rotating ceramic discs is already known per se and is commonly called ceramic cartridge of the handshower.

[0025] According to the invention, the cartridge of the two discs 11 and 12 and the tubular control body 13 form the selection mechanism together with the operating member 5, which is illustrated in the following.

[0026] The tubular control body 13 features a first cylindrical portion with a larger diameter 13a adjacent to the ceramic disc 12 integral therewith. The tubular control body further features a second portion with a smaller diameter 13b which protrudes from the first portion 13a and engages, as said above, into the seat 3b of the supply body 3. On the outside of this smaller-diameter portion 13b a series of saw teeth 14 are obtained having the shape of a complete circular toothing.

[0027] Astride of this portion 13b equipped with the saw teeth 14, a fork-shaped push-button 15 is further provided, equipped with a pivoting dog spike or pawl hook 16.

[0028] The fork-shaped push-button features a thickened base portion 15a, which protrudes from the housing 2 through an opening 2a, and two side wings 17a and 17b, tapered at their ends, which enclose sideways the smaller-diameter portion 13b.

[0029] The two wings 17a and 17b are arranged and sized so that they can slide, in a crosswise direction to the longitudinal axis of the handle 1, between the housing 2 and the walls of the guide element 7 (fig. 3). In this way the push-button 15 is free to slide crosswise to the handle, covering a total stroke of about 6 mm, but it cannot rotate about the longitudinal axis.

[0030] According to the illustrated preferred embodiment, the dog spike comprises a hook 16 mounted pivoting on a pin integral with one of the two wings, for example the right hand wing 17a. Preferably, the hook is housed in a well provided within the wing 17a, so that the pivot pin is supported, in the wing 17a, at both its ends.

[0031] As can be seen, the hook 16 is arranged laterally offset in respect of the toothing 14 of the control body 13 and is kept radially driven inwards - so as to engage with the saw teeth - by suitable elastic means, for example by a plastic material flap 18.

[0032] Furthermore, the side wings 17a and 17b are partly interrupted to make room for two thrust springs 19a and 19b which are restrained, on one side, against an abutting surface (not shown in the drawings) of the push-button 15 and, on the other side, against the inner surface of the housing 2. In this way the push-button 15 is kept driven towards the outside of the housing 1.

[0033] Preferably, the springs 19a and 19b are arranged in an anti-symmetrical position, as shown in fig. 5, because this arrangement provides the best equilibrium of the forces acting on the push-button 15.

[0034] During its operation, the push-button 15 is made to slide (active run) towards the inside of the handle (arrow F in fig. 3) acting on the operation push-button 15a to oppose the action of the springs 19a and 19b (in fig. 2B the push-button is shown at an end stop with the spring 19b compressed). While sliding, the hook 16 is itself shifted in the direction of the arrow F, causing the rotation of the toothing 14 according to arrow R - and therefore of the control body 13 - by a preset angle: this angle is for example about 45° for a maximum 6-mm stroke of the push-button 15.

[0035] Releasing pressure on the portion 15a, the push-button 15 is newly driven outwards by the springs 19a and 19b (passive run) and the hook slides over the toothing 14, oscillating backwards against the elastic force of the flap 18, until it is newly engaged with a successive tooth. As can be guessed, this run is substantially passive, since the dog spike is not capable of causing the control body 13 to rotate, which hence remains stationary.

[0036] At this point the mechanism has repositioned itself in a condition which allows to repeat the previous step of pushing button 15.

[0037] As can be guessed, by repeatedly pressing button 15a it is possible to have the control body 13 perform a complete rotation even by multiples of 360°, always in the same direction.

[0038] The rotation of the control body 13 causes, in turn, the rotation of the ceramic disc 12 in respect of the ceramic disc 11, achieving the desired setting selection, that is, connecting the supply conduit 3 with the desired one of the channels 1c, by coupling one of the respective holes 11a with one of the two dispensing ports 12a.

[0039] In the exemplary case shown, the inlet ports 11a are four, mutually angularly spaced apart by 90°, while the dispensing ports 12a are two and mutually angularly spaced apart by a suitable angle, so that, at each relative 45° rotation - i.e. following each pressure on the push-button - it is possible to change the setting and thereby the function of the distributor.

[0040] The objects set forth in the introduction are hence fully achieved. A selection mechanism has in fact

been provided which allows to intervene through an adjustment control always in the same direction (i.e. by repeatedly pushing button 15, which is brought back into its home position by springs 19a and 19b). Furthermore,

5 the mechanism of the invention allows to perform the selection over a full, 360° circumferential path, hence with the possibility of deviating the main flow onto multiple different secondary conduits, as many as can be housed in a full disc having a diameter equivalent to the section of the handshower handle.

[0041] Finally, the operation push-button 15a, being arranged along the handshower handle, is easily accessible by the fingers of a hand without having to interfere with the flow of water dispensed by the headpiece of the handshower.

15 **[0042]** However, it is understood that the invention is not limited to the specific embodiment illustrated above, which represents only a non-limiting example of the scope of the invention, but that a number of changes 20 may be made, all within the reach of a skilled person in the field, without going beyond the scope of the invention.

[0043] For example, the ceramic disc 11 is provided 25 as a self-contained piece successively mounted integral with the insert body 4 made of plastic material. As a matter of fact, the ceramic material has proved particularly suitable to achieve the watertight rotation coupling which must be established with the distributor disc 12. However, a different configuration is not ruled out.

30 **[0044]** Furthermore, in the context of the teaching offered here, the term "saw toothing" is intended to mean any arrangement of notches or recesses on the outer surface of the control body 13 which allows it to be rotation-driven by the dog spike 16 only in one displacement direction of the push-button 15.

[0045] Finally, although the push-button has always 35 been illustrated arranged so as to protrude underneath the handle - i.e. on the same side where water is dispensed by the head of the handshower - its orientation 40 can be chosen depending on other criteria, for example it could protrude above or sideways of the handle depending on the applications.

45 **Claims**

1. Handshower of the type comprising a handle (1) and a dispensing head equipped with a plurality of delivery conduits ending with inlet ports (11a) circumferentially distributed in a connection body (11) and further comprising a selection body (12) equipped with at least one dispensing port (12a) which may be shifted in correspondence of said inlet ports (11a) by means of a rotation of said selection body (12) in relation to the connection body (11), **characterised in that** said selection body (12) is integral with a circular saw toothing (14) and said handle houses a push-button (15), translatable sub-

- stantially crosswise to the rotation axis of said selection body (12), provided with a dog spike (16) capable of driving into rotation said saw toothing (14) in one displacement direction of said push-button (15), but not in the opposite direction.
2. Handshower as claimed in claim 1), wherein said push-button (15) is driven radially outwards of the handle through first elastic means (19a, 19b) and said displacement direction which causes the rotation of the saw toothing (14) is the opposite one.
3. Handshower as claimed in claim 1) or 2), wherein said dog spike consists of a hook (16) mounted pivoting onto said push-button (15) in a position laterally offset in respect of said toothing (14) and driven to engage with said toothing (14) by second elastic means (18).
4. Handshower as claimed in any one of the previous claims, wherein said push-button (15) is fork-shaped, the basis of which forms an operation-button portion (15a) and the two wings of which (17a, 17b) are arranged at the two opposite sides of said circular saw toothing (14).
5. Handshower as claimed in claim 4), wherein said fork-shaped push-button is housed inside the handshower handle (1) and protrudes from a handle opening (2a) only by said operation button portion (15a).
6. Handshower as claimed in any one of the previous claims, wherein said saw toothing (14) is obtained on the outer surface of a tubular control body (13) integral by an end with said selection body (12).
7. Handshower as claimed in claim 6), wherein said tubular control body (13) is made of moulded plastic material, while said selection body (12) and said connection body (11) are made of ceramic material and are mutually coupled by sliding fit.
8. Handshower as claimed in claims 6) or 7), wherein said tubular control body (13) is supported with one of its ends in an inner seat (3b) of a supply duct (3) housed inside said handle (1).
9. Handshower as claimed in claim 8), wherein said supply duct (3), in correspondence of said seat (3b), opens out into a flange (3f) from which a U-shaped extension (7) projects capable of serving as a guide to said push-button (15).
10. Handshower as claimed in any one of the previous claims, wherein said dispensing ports (12a) are two, mutually angularly spaced apart in a suitable manner.
- 5 11. Handshower as claimed in any one of the previous claims, wherein said connection body (11) is applied onto the end surface of an insert body (4) equipped with said plurality of channels (1c) and which is integral with a coupling end (1b) of said handle intended to engage with the handshower dispensing head.
- 10 12. Handshower as claimed in claim 11), wherein from said insert body (4) a support pin (10) extends, onto which the connection body (11) is fixed and onto which said selection body (12) is rotatably supported.
- 15 13. Selector device for a handshower having multiple delivery conduits, of the type comprising a cartridge with a pair of mutually rotatably-coupled discs (11, 12) having derivation ports, **characterised in that** at least one (12) of said cartridge discs (12) is integral with a circular saw toothing (14) and **in that** it further comprises a push-button translatable crosswise to the rotation axis of said mutually rotating discs (11, 12) and equipped with a dog spike capable of driving into rotation said toothing (14) in one translation direction and not in the opposite direction.
- 20 14. Device as claimed in claim 13), wherein said push-button is radially driven away from said toothing (14) by first elastic means (19a, 19b) and said translation direction causing the rotation of the saw toothing (14) is the opposite one.
- 25 15. Device as claimed in claim 13) or 14), wherein said dog spike consists of a hook (16) mounted pivoting onto said push-button (15) in a position laterally offset in respect of said toothing (14) and driven to engage with said toothing (14) by second elastic means (18).
- 30 40 16. Device as claimed in any one of the claims 14) to 16), wherein said push-button (15) is fork-shaped, the base forming an operation-button portion (15a) and the two wings (17a, 17b) being arranged at the two opposite sides of said circular saw toothing (14).
- 35 45 17. Device as claimed in any of the claims 13) to 16), wherein said saw toothing (14) is obtained on the outer surface of a tubular control body (13) integral by one end with said cartridge disc (12).
- 50 18. Device as claimed in claim 17), wherein said control body is made of moulded plastic material, while said cartridge discs (11, 12) are made of ceramic material and are mutually coupled by sliding fit.
- 55 19. Device as claimed in claims 17) or 18), wherein said

tubular control body (13) is rotatably connected by one of its ends to a handshower supply duct (3).

20. Device as claimed in claim 19), wherein the end of said supply duct (3) connected with the tubular control body (13) opens out into a flange (3f) from which a U-shaped extension (7) projects, capable of serving as a guide for said push-button (15). 5

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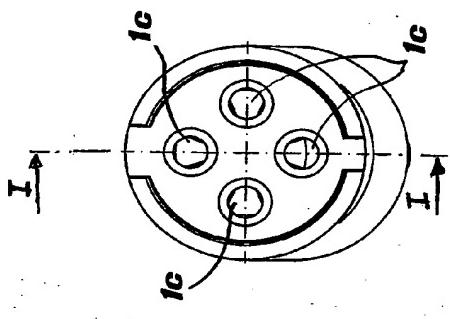


FIG. 1A

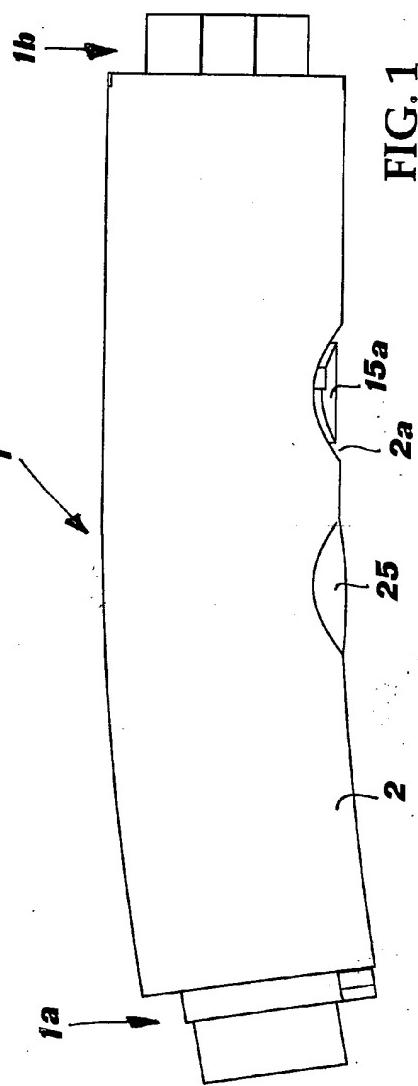
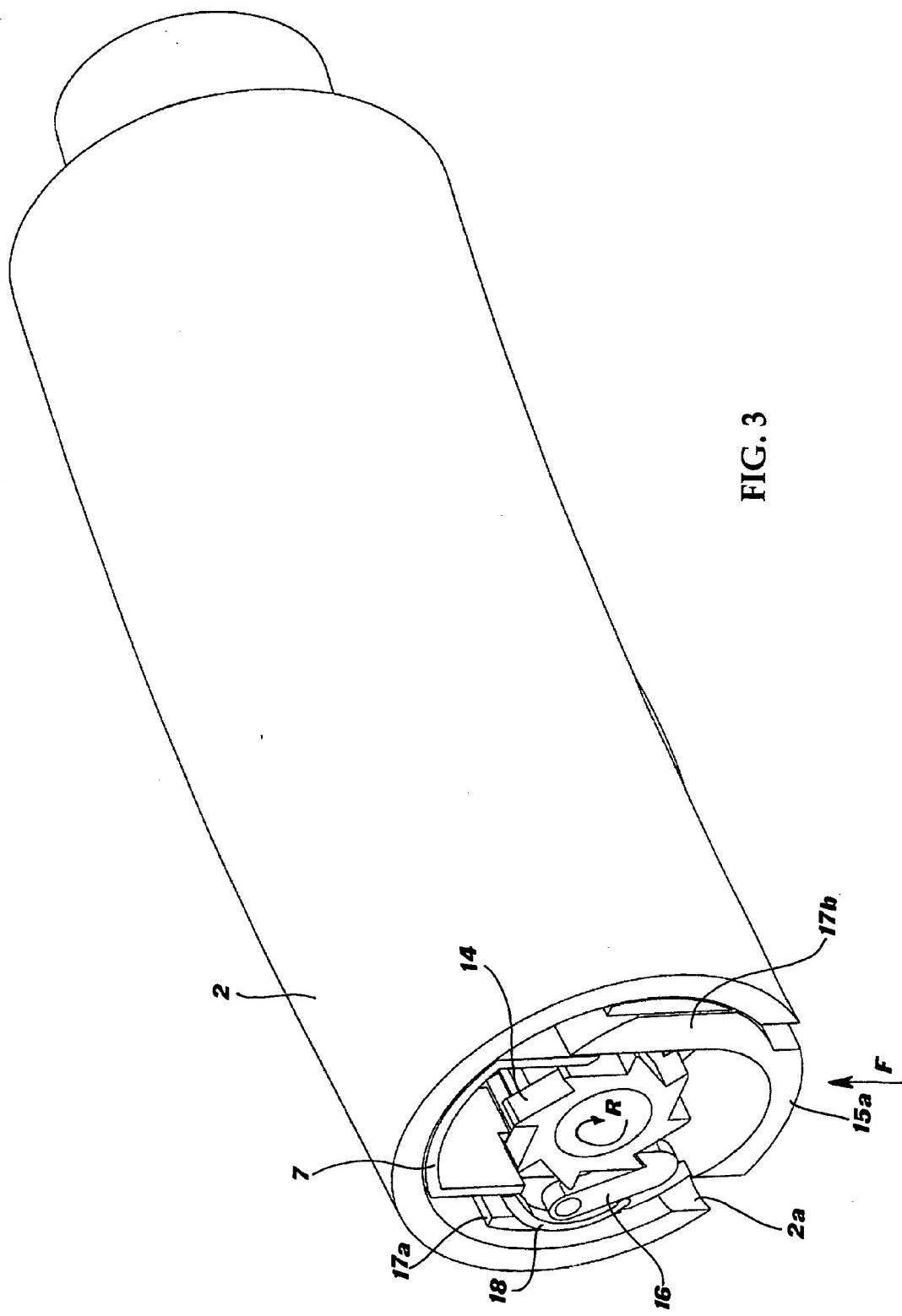


FIG. 3



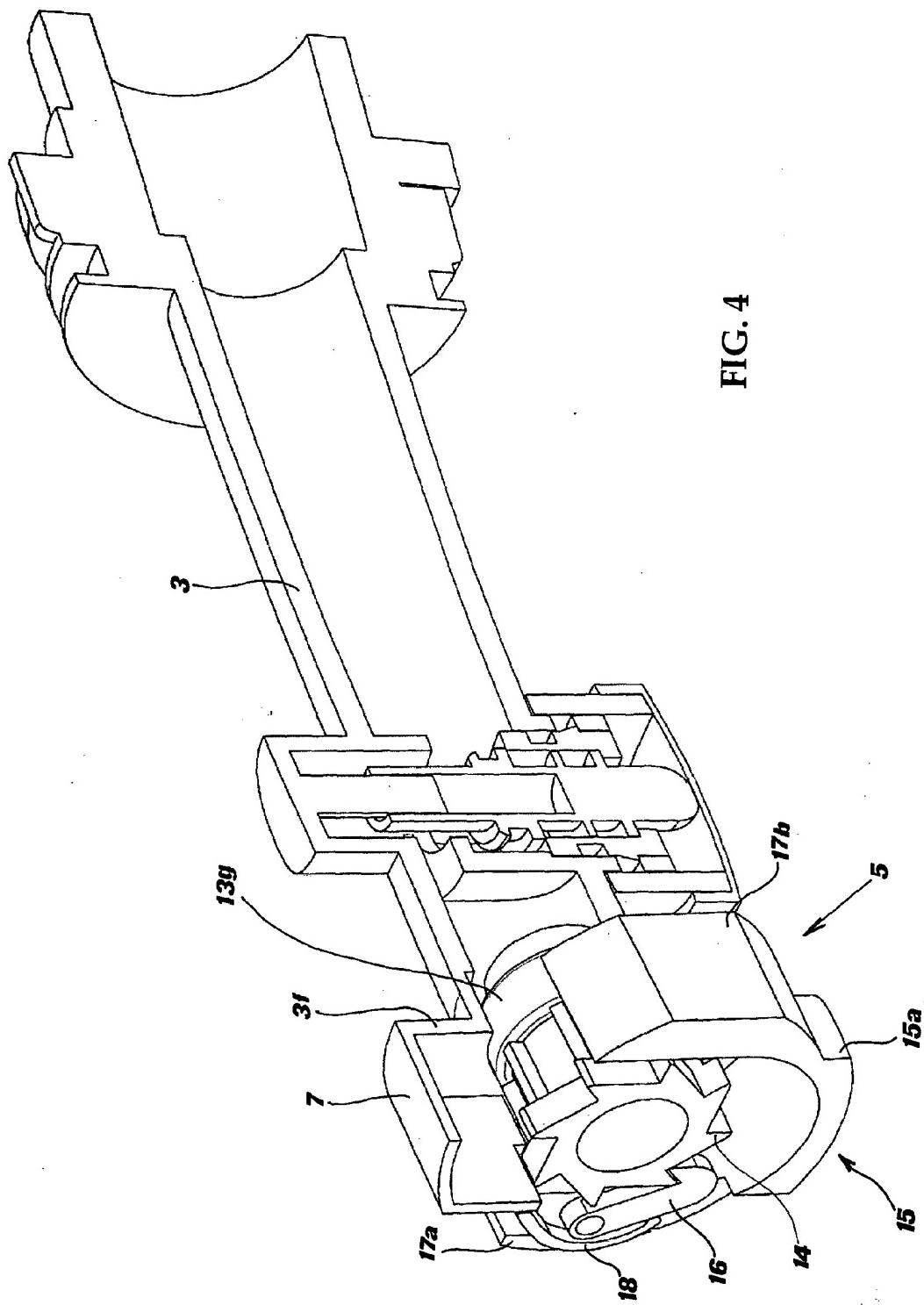


FIG. 4

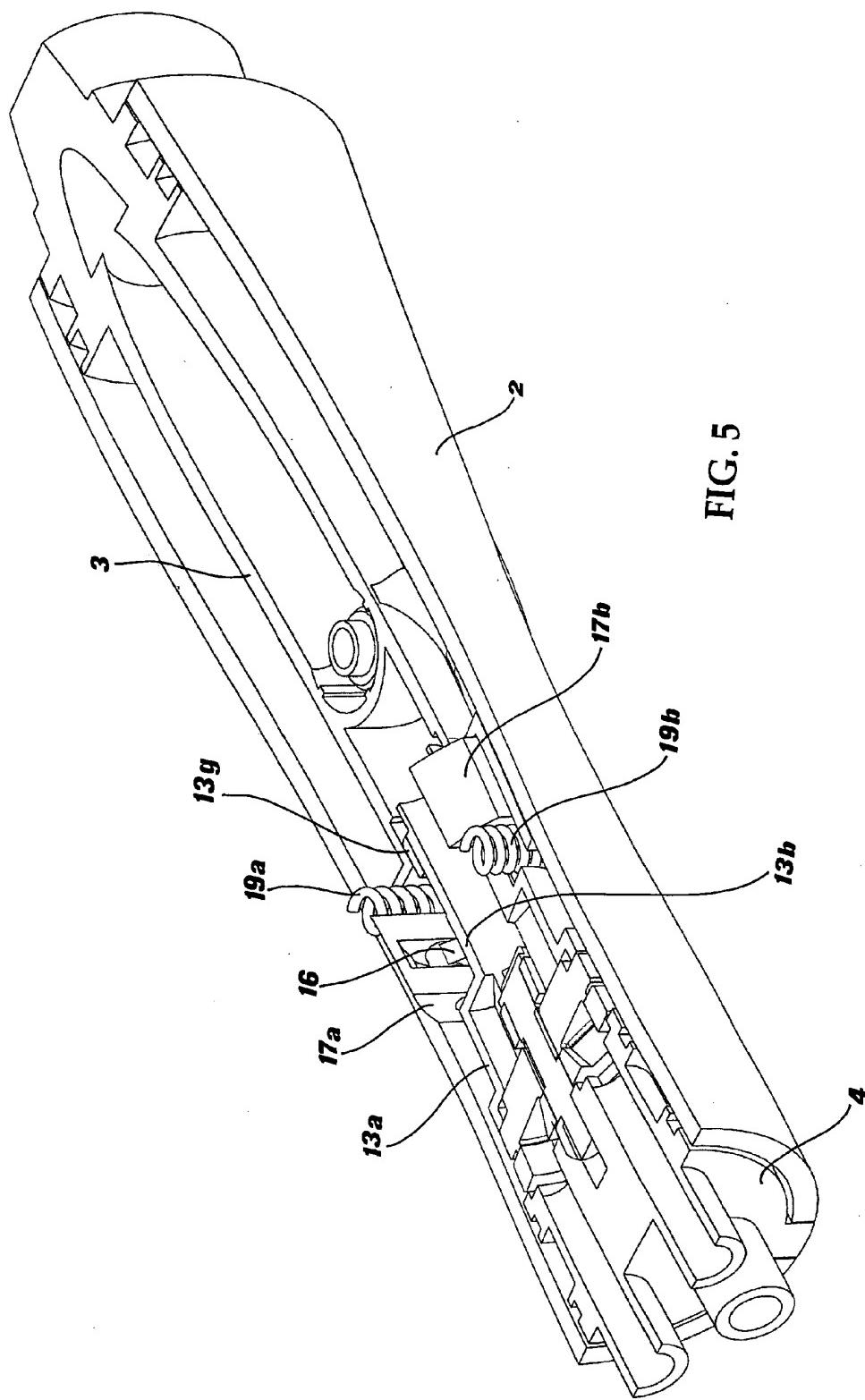


FIG. 5

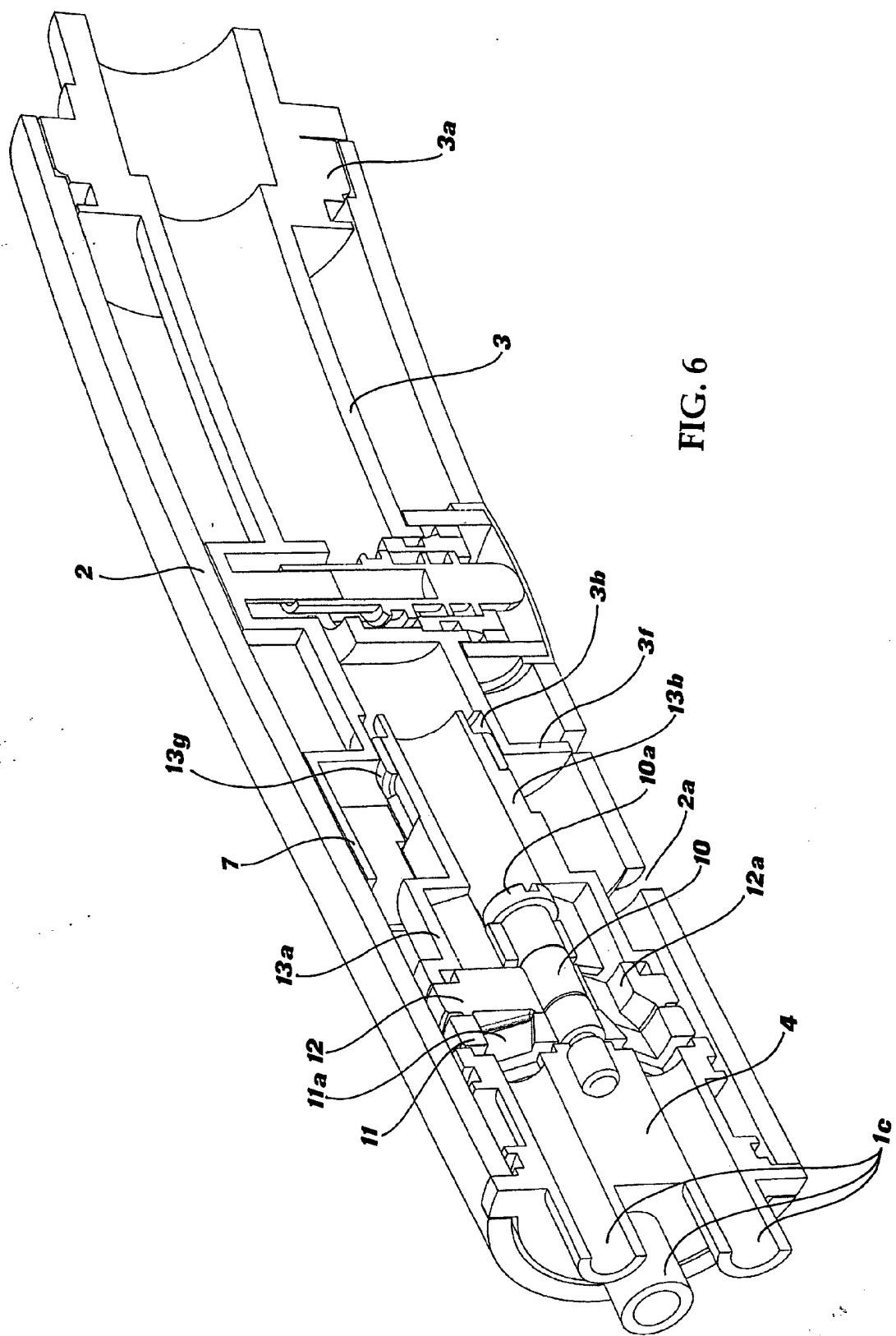


FIG. 6

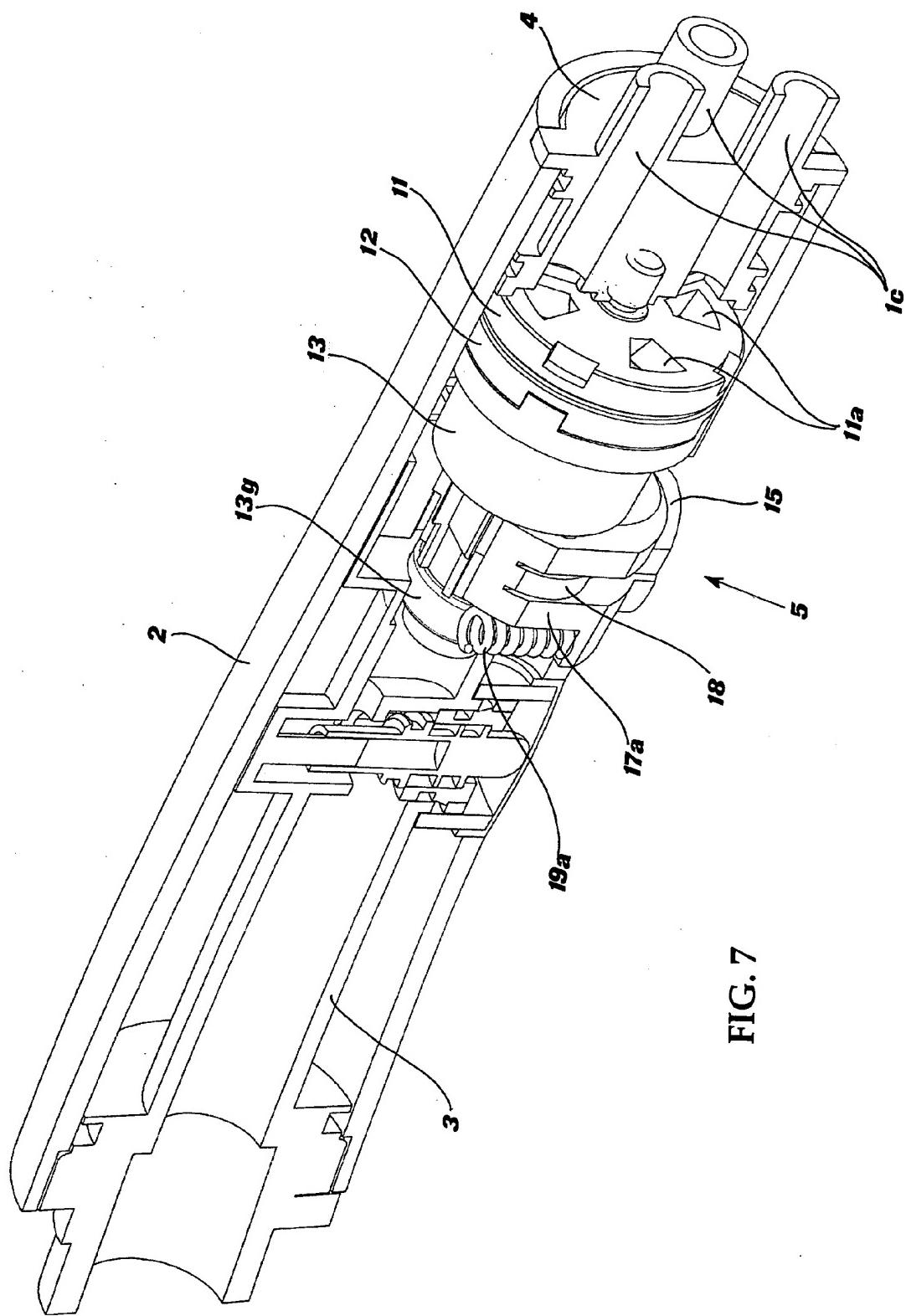


FIG. 7



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 04 42 5187

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
X	US 6 622 945 B1 (YAN LEN GEN ET AL) 23 September 2003 (2003-09-23) * column 3, line 38 - column 4, line 18; figures * -----	1-3,6,7, 10, 13-15, 17-19	B05B1/16
A	US 5 433 384 A (FORD JOSEPH E ET AL) 18 July 1995 (1995-07-18) * the whole document * -----	1-3, 13-15	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
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The present search report has been drawn up for all claims			
3	Place of search	Date of completion of the search	Examiner
	The Hague	24 January 2005	Brévier, F
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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 04 42 5187

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on. The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

24-01-2005

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